REMARKS

Present Status of the Application

Claims 1-21 remain pending in the present application of which claim 13 has been amended for correcting a minor typographical error. It is believed that no new matter adds by way of amendments to claims, drawings, specification or otherwise to the application. For at least the following reasons, Applicants respectfully submit that claims 1-21 are in proper condition for allowance and reconsideration of this application is respectfully requested.

Discussion of the claim rejection under 35 USC 103

The Office Action rejected claims 1-21 under 35 USC 103(a) as being unpatentable over Tungare et al. (US-6,594,414, hereinafter Tungare) in view of Kato et al. (US-6,326,216, hereinafter Kato).

Applicants respectfully disagree and traverse the above rejections as set forth below. Independent claims 1 and 12, are allowable for at least the reason that Tungare and Kato fail to teach or disclose each and every features of claims 1 and 12. More specifically, Kimura substantially fails to teach, suggest or disclose a method of forming an epitaxial layer on a substrate, comprising at least the steps of "forming a lanthanum nickel oxide (LNO) thin film by an in-situ method such that the lanthanum nickel oxide (LNO) thin film is grown with a lattice structure; and forming the PZT thin film on the LNO thin film by an in-situ method such that the PZT thin film is epitaxially grown with a lattice structure the same as the LNO thin film by an in-

situ method such that the PZT thin film is epitaxially grown with a lattice structure the same as the LNO thin film at a temperature of about 350 to about 500 degrees Celsius" as required by the proposed independent claims 1 and 12. The advantage of forming the PZT thin film on the LNO layer is that the PZT layer could be grown with a lattice structure same as that of LNO at a lower temperature, for example, about 350-500 °C, which is a acceptable structure and electrical property for the intended functionalities. Therefore, not only the thermal budget can be substantially reduced but also the contamination of PZT layer on the machine.

The Office Action, on pages 2 and 3, acknowledged that Tungare substantially teaches forming a PZT film on a barium titanate layer. Furthermore, Tungare suggests a list of materials for electrode layer 513 including conductive monocrystalline oxides such as strontium, ruthenium, strontium vanadate, LaSrCoO3 and LNO. The Office Action further acknowledged that Tungare does not disclose the growth of PZT on LNO by an in-situ method such that the PZT takes the lattice structure of LNO at a temperature of about 350-500 °C. However, relied upon Kato to disclose the sputtering method for forming the PZT film and also lower annealing temperature of 400-700 °C. It would have been obvious to one skilled in the art at the time of the present invention to modify the disclosure of Tungare with Kato's sputtering method because PZT was known by Kato to be deposited by sputtering and that motivation is given in Kato in that PZT obtained contributed to the production of yields of the device into which it was integrated.

Applicants respectfully disagree and would like to point out that even though Tungare

teaches a list of materials for electrode layer 513 including conductive monocrystalline oxides such as strontium, ruthenium, strontium vanadate, LaSrCoO3 and LNO, still Tungare substantially fails to teach what the effects of the annealing temperature at which the PZT film is grown will have on the performance of the capacitor and or contamination problems of fabrication machineries with the PZT layers. Accordingly, Tungare cannot possibly teach, suggest that LNO layer could be advantageously applied for reducing the annealing temperature at which the PZT film is grown. Furthermore, Kato expressly teaches, at lines 7-11 of col. 11, that when PZT is annealed at 850°C, PZT is always liable to undergo an oxygen defect because it takes a perovskite crystal structure including much oxygen which would result into a poor crystalline structure, and to resolve this problem, Kato proposes to grow the PZT film (24) on a pt layer (23a) at an annealing temperature of 500 to 800 °C (please see col. 12, line 32). Therefore, Kato would not have suggested one skilled in the art to particularly grow the PZT layer on LNO layer at a temperature not exceeding 500 °C, more specifically between 350-500 °C, to achieve the claimed invention.

In other words, Applicants respectfully submit that the present inventors discovered and recognized the source of the problems as to what causes the defects in the capacitor and or contamination of fabrication machineries with PZT layer, and then set out to find a remedy to such problems. According to the present inventors, an annealing temperature of above 500 °C (including the annealing temperature 500-800 °C suggested by Kato) is not only undesirable temperature for capacitor dielectric, but also cause contamination of the fabrication

machineries with PZT layer. Accordingly, the present inventors conducted a series of experiments and propose growing PZT layer on LNO layer because LNO layer would allow lower the annealing temperature to about 350-500 °C with acceptable structural and electrical property for intended functionalities and thereby effectively reduce the defects and contamination problems discussed above. Accordingly, Applicants would like to point out that the inquiry is not whether each element existed in the prior art, but whether the prior art made obvious the invention as a whole for which patentability is claimed. A patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified, and the question here is whether the prior art discovered/recognized the cause of the defect of the capacitor and or contamination of the fabrication machineries with PZT layer, which the present inventors intends to solve.

In other words, Tungare and Kato substantially fails to teach, suggest or disclose a step of at least "growing a PZT layer on the LNO layer at a temperature of about 350 to about 500 degrees Celsius" as required by the proposed independent claims 1 and 12, instead Tungare substantially fails to teach or suggest any annealing temperature for growing PZT film and Kato substantially suggests growing a PZT film (24) on a pt film (23a) (please see col. 12, line 32) at 500-800 °C. Accordingly, Applicants respectfully submit that Tungare and Kato cannot possibly meet claims 1 and 12 in this regard.

Thus, both Tungare and Kato, either alone or in combination, fail to teach each and every feature of the proposed independent claims 1 and 12.

Claims 2-11 and 13-21, which depend from Claims 1 and 12, directly or indirectly, are also patentable over Tungare and Kato, at least because of their dependency from an allowable base claim.

For at least the foregoing reasons, Applicants respectfully submit that claims 1-21 patently define over Tungare and Kato, and therefore should be allowed. Reconsideration and withdrawal of the above rejections is respectfully requested.

CONCLUSION

For at least the foregoing reasons, it is believed that all the pending claims 1-21 of the present application patently define over the prior art and are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
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